

# CLAIMS

1. A glass comprising:

Oxide	Mole %
SiO <sub>2</sub>	35 - 75
GeO <sub>2</sub>	0-10
B <sub>2</sub> O <sub>3</sub>	0 - 8
Al <sub>2</sub> O <sub>3</sub>	0 - 8
Li <sub>2</sub> O	>0 - 25
Na <sub>2</sub> O	0 - 60
K <sub>2</sub> O	0 - 6
MgO	0 - 35
Σ BaO, SrO, CaO, ZnO, PbO	0 - 10
TiO <sub>2</sub>	0 - 5
La <sub>2</sub> O <sub>3</sub>	0 - 30
RE <sub>2</sub> O <sub>3</sub>	0 - 12
Y <sub>2</sub> O <sub>3</sub>	>0 - 30
As <sub>2</sub> O <sub>3</sub>	0 - 0.5
F	0 - 5
Sum R <sub>2</sub> O <sub>3</sub> , R=Al, B, La and RE	0 - 40

wherein RE represents rare earth ions, excluding La.

2. A glass according to claim 1, having the following properties:

Property	Range
$n_d$	$> 1.5$
T(%) at 1550 nm for 1.0 mm	$> 88$
CTE (-30 to +70°C) $\times 10^{-7}/^{\circ}\text{C}$	$\geq 90$ , especially $\geq 110$
E (GPa)	$> 80$
Tg (°C)	$\geq 350$

3. A glass according to claim 1,

Oxide	Mole %
SiO <sub>2</sub>	40 - 70
GeO <sub>2</sub>	0-5
B <sub>2</sub> O <sub>3</sub>	0 - 5
Al <sub>2</sub> O <sub>3</sub>	0 - 5
Li <sub>2</sub> O	$> 0 - 25$
Na <sub>2</sub> O	0 - 35
K <sub>2</sub> O	0 - 5
MgO	0 - 25
$\Sigma$ BaO, SrO, CaO, ZnO, PbO	0 - 5
TiO <sub>2</sub>	0 - 3
La <sub>2</sub> O <sub>3</sub>	0 - 12
RE <sub>2</sub> O <sub>3</sub>	0 - 10
Y <sub>2</sub> O <sub>3</sub>	$> 0 - 25$
As <sub>2</sub> O <sub>3</sub>	0 - 0.3
F	0 - 3
Sum R <sub>2</sub> O <sub>3</sub> , R=Al, B, La and RE	0 - 40

4. A glass according to claim 3, having the following properties:

Property	Range
$n_d$	1.50 - 1.70, especially 1.50 - 1.65
T(%) at 1550 nm for 1.0 mm	> 90
CTE (-30 to +70°C) $\times 10^{-7}/^{\circ}\text{C}$	> 100, especially > 110
T <sub>g</sub> (°C)	$\geq 400$
E [GPa]	> 85

5. A glass comprising:

Oxide	Mole %
SiO <sub>2</sub>	40-60
GeO <sub>2</sub>	0-10
B <sub>2</sub> O <sub>3</sub>	0-10
Al <sub>2</sub> O <sub>3</sub>	0-4
Li <sub>2</sub> O	> 0-26
Na <sub>2</sub> O	> 0-26
K <sub>2</sub> O	0-15
MgO	0-15
$\Sigma$ BaO, SrO, CaO, ZnO, PbO	0-10
TiO <sub>2</sub>	0-9
ZrO <sub>2</sub>	0-2
La <sub>2</sub> O <sub>3</sub>	0-4
Re <sub>2</sub> O <sub>3</sub>	0-4
Y <sub>2</sub> O <sub>3</sub>	> 0-5
Sc <sub>2</sub> O <sub>3</sub>	0-4
Nb <sub>2</sub> O <sub>5</sub>	0-2
F	0-5

$\Sigma R_2O_3$ , R=Al, B, La, and RE	0-25
As <sub>2</sub> O <sub>3</sub>	0-0.5

wherein RE represents rare earth ions, excluding La.

6. A glass according to claim 5, having the following properties:

Property	Range
$n_d$	> 1.5
T(%) at 1550 nm for 1.0 mm	> 88
CTE (-30 to +70°C) $\times 10^{-7}/^{\circ}C$	$\geq 90$
E (GPa)	> 80
T <sub>g</sub> (°C)	$\geq 350$

7. A glass according to claim 5 comprising:

Oxide	Mole %
SiO <sub>2</sub>	45-55
GeO <sub>2</sub>	0-5
B <sub>2</sub> O <sub>3</sub>	0-8
Al <sub>2</sub> O <sub>3</sub>	0-2
Li <sub>2</sub> O	> 0-17
Na <sub>2</sub> O	> 0-19
K <sub>2</sub> O	0-6
MgO	0-13
$\Sigma$ BaO, SrO, CaO, ZnO, PbO	0-5
TiO <sub>2</sub>	0-5
ZrO <sub>2</sub>	0-1
La <sub>2</sub> O <sub>3</sub>	0-3
RE <sub>2</sub> O <sub>3</sub>	0-3

Y <sub>2</sub> O <sub>3</sub>	>0-4.5
Sc <sub>2</sub> O <sub>3</sub>	0-3
Nb <sub>2</sub> O <sub>5</sub>	0-1
F	0-3
Σ R <sub>2</sub> O <sub>3</sub> , R= Al, B, La, and RE	0-15
As <sub>2</sub> O <sub>3</sub>	0-0.3

8. A glass according to claim 7, having the following properties:

Property	Range
n <sub>d</sub>	1.50-1.70
T(%) at 1550 nm for 1.0 mm	> 90
CTE (-30 to +70°C) x 10 <sup>-7</sup> /°C	≥ 100
T <sub>g</sub> (°C)	≥ 400
E [GPa]	> 85

9. A glass comprising:

Oxide	Mole %
SiO <sub>2</sub>	45.0-58.0
B <sub>2</sub> O <sub>3</sub>	0.0-5.0
Al <sub>2</sub> O <sub>3</sub>	0.0-3.0
Li <sub>2</sub> O	6.5-16.5
Na <sub>2</sub> O	7.0-24.0
K <sub>2</sub> O	0.0-12.0
MgO	0.0-8.0
CaO	0.0-8.0

SrO	0.0-8.0
BaO	0.0-8.0
TiO <sub>2</sub>	0.0-12.0
ZrO <sub>2</sub>	0.5-5.5
Ta <sub>2</sub> O <sub>5</sub>	0.0-1.0
Gd <sub>2</sub> O <sub>3</sub> + La <sub>2</sub> O <sub>3</sub> +Y <sub>2</sub> O <sub>3</sub>	2.70-3.30
As <sub>2</sub> O <sub>3</sub>	0.0-0.15

wherein RE represents rare earth ions, excluding La.

10. A glass according to claim 9, having the following properties:

Property	Range
$n_d$	> 1.5
T(%) at 1550 nm for 1.0 mm	> 88
CTE (-30 to +70°C) $\times 10^{-7}/^{\circ}\text{C}$	$\geq 90$
E (GPa)	> 80
T <sub>g</sub> (°C)	400-485

11. A glass according to claim 9, comprising:

Oxide	Mole %
SiO <sub>2</sub>	46.0-52.0
Al <sub>2</sub> O <sub>3</sub>	0.0-1.5
B <sub>2</sub> O <sub>3</sub>	0.0-1.0
Li <sub>2</sub> O	7.0-16.0
Na <sub>2</sub> O	7.0-20.0
K <sub>2</sub> O	4.0-12.0
MgO	0.0-7.5
CaO	0.0-7.5
SrO	0.0-7.5
BaO	0.0-7.5
TiO <sub>2</sub>	1.0-10.5
ZrO <sub>2</sub>	1.5-5.0
Ta <sub>2</sub> O <sub>5</sub>	0.3-0.7
La <sub>2</sub> O <sub>3</sub> + Gd <sub>2</sub> O <sub>3</sub> + Y <sub>2</sub> O <sub>3</sub>	2.6-2.9
As <sub>2</sub> O <sub>3</sub>	0.0-0.15

12. A glass according to claim 11, having the following properties:

Property	Range
$n_d$	1.50 - 1.70
T(%) at 1550 nm for 1.0 mm	> 88
CTE (-30 to +70°C) $\times 10^{-7}/^{\circ}\text{C}$	> 100
T <sub>g</sub> (°C)	415-480
E [GPa]	> 80

13. An interference filter comprising a glass substrate having at least two interference layers coated thereon, wherein the glass substrate is a glass according to claim 1.

14. An interference filter comprising a glass substrate having at least two interference layers coated thereon, wherein the glass substrate is a glass according to claim 5.

15. An interference filter comprising a glass substrate having at least two interference layers coated thereon, wherein the glass substrate is a glass according to claim 9.

16. A fiber optic system comprising a light source, a fiber optic transmission component, a receiver of transmitted radiation and an interference filter comprising a glass substrate having at least two interference layers coated thereon, said glass substrate comprising a glass according to claim 1.

17. A fiber optic system comprising a light source, a fiber optic transmission component, a receiver of transmitted radiation and an interference filter

comprising a glass substrate having at least two interference layers coated thereon, said glass substrate comprising a glass according to claim 5.

18. A fiber optic system comprising a light source, a fiber optic transmission component, a receiver of transmitted radiation and an interference filter comprising a glass substrate having at least two interference layers coated thereon, said glass substrate comprising a glass according to claim 9.

19. A process for making a glass according to claim 1, comprising melting raw materials corresponding to oxides in the glass, refining a resultant glass melt, casting the melt in a mold and optionally annealing.

20. A process for making a glass according to claim 1, comprising casting into a mold a glass melt produced from raw materials corresponding to oxides in the glass.

21. A process for making a glass according to claim 5, comprising casting into a mold a glass melt produced from raw materials corresponding to oxides in the glass.

22. A process for making a glass according to claim 9, comprising casting into a mold a glass melt produced from raw materials corresponding to oxides in the glass.

23. A demultiplexing optical component comprising the interference filter of claim 13.

24. A demultiplexing optical component comprising the interference filter of claim 14.

25. A demultiplexing optical component comprising the interference filter of claim 15.



26. A method of demultiplexing, comprising passing an optical signal of multiple wavelengths through a demultiplexing optical component according to claim 23.

27. A method of demultiplexing, comprising passing an optical signal of multiple wavelengths through a demultiplexing optical component according to claim 24.

28. A method of demultiplexing, comprising passing an optical signal of multiple wavelengths through a demultiplexing optical component according to claim 25.

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